

The July 2006 Heat Storm from a Load Forecaster's Perspective

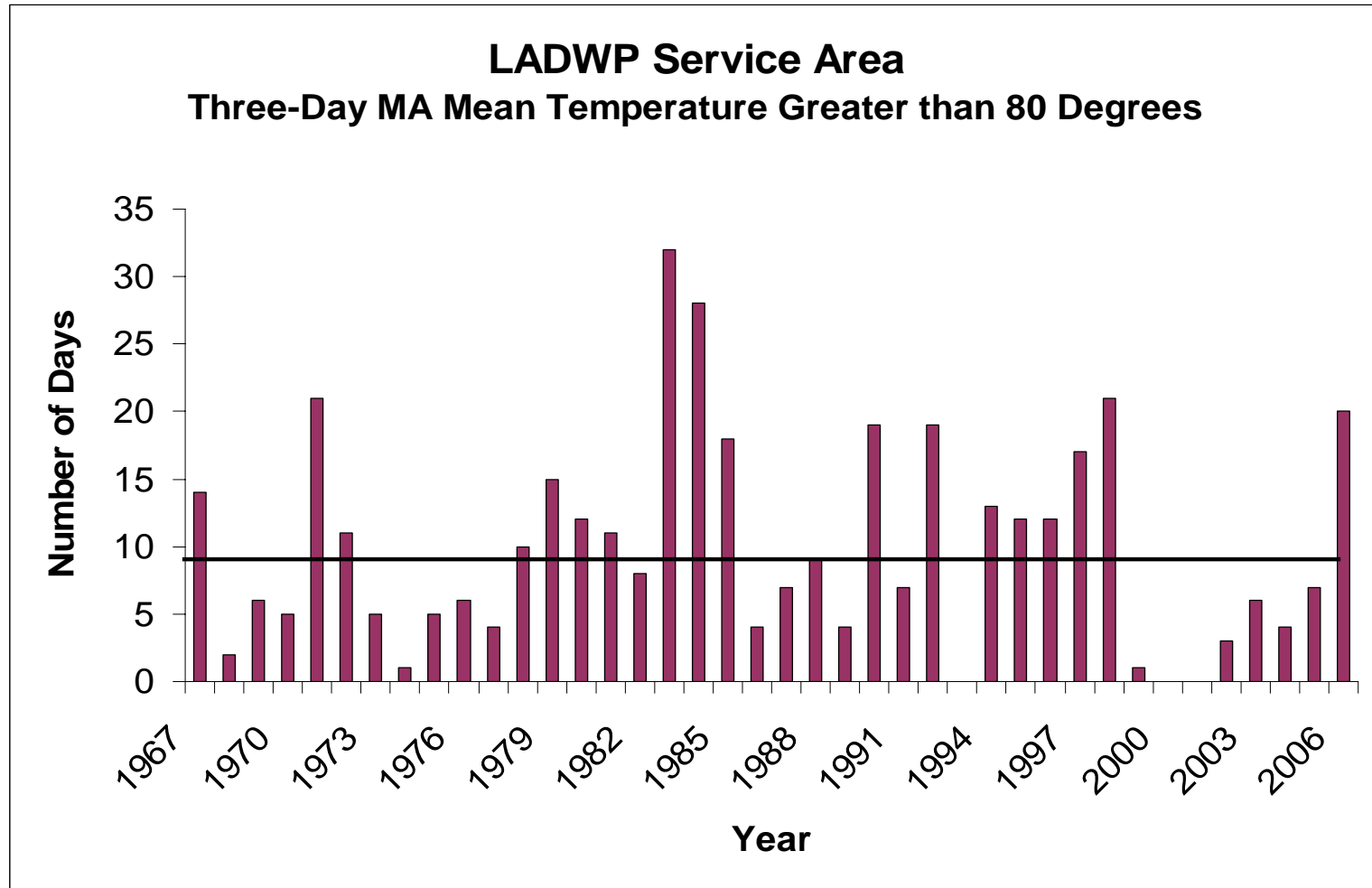
Michael Cockayne
LADWP Load Forecast Supervisor
213-367-0243
Michael.Cockayne@LADWP.com

Heat Storm Comparisons

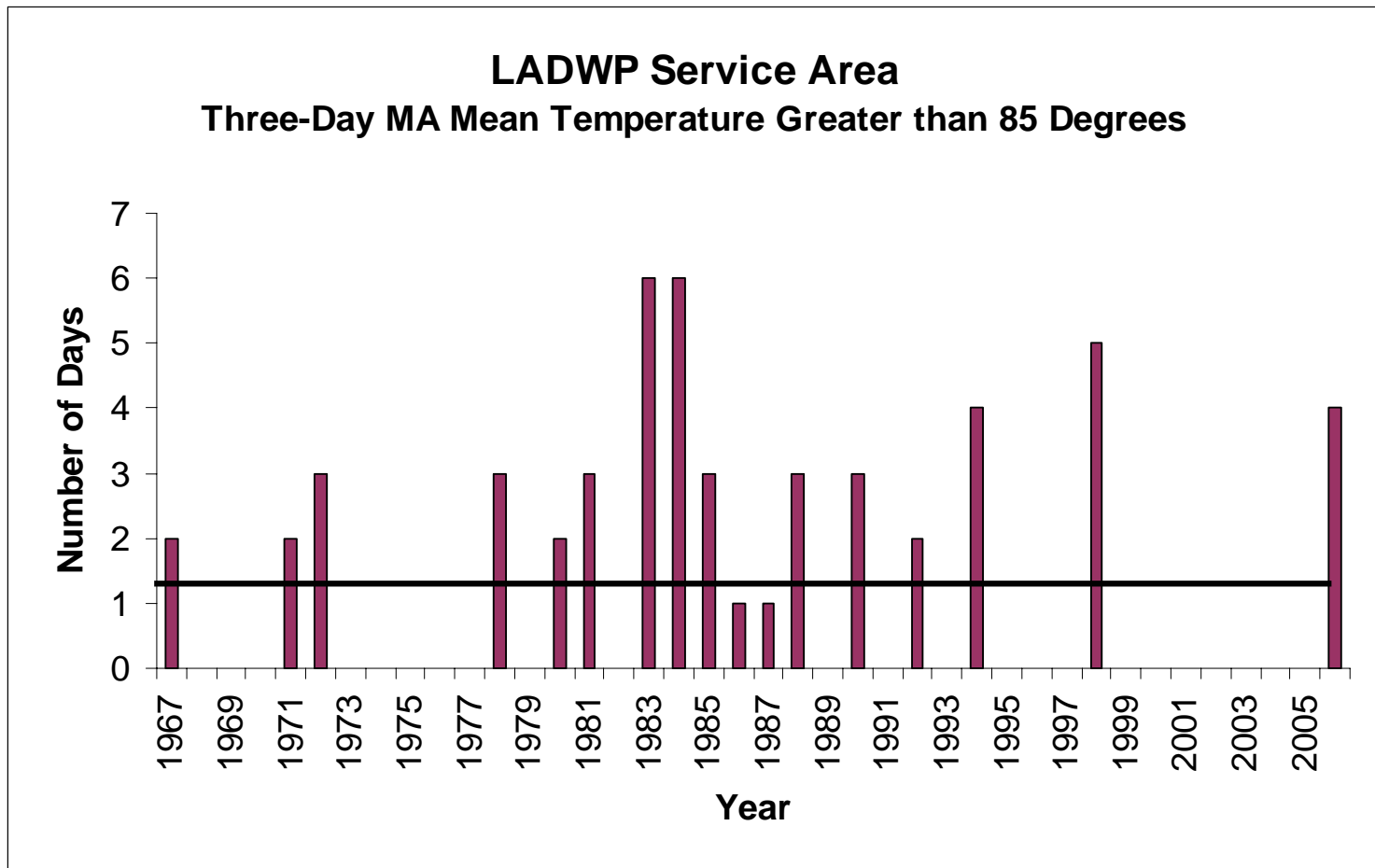
LADWP Service Area

Heat Storm Event	Start	End	Intensity	Duration	Rank
July-06	7/15/2006	7/29/2006	6.7	15	1
August-98	8/29/1998	9/4/1998	12.6	7	2
September-71	9/8/1971	9/15/1971	5.2	8	3
August-94	8/11/1994	8/18/1994	3.3	8	4
August-83	8/6/1983	8/18/1983	0.6	13	5
September-84	9/4/1984	9/10/1984	5.2	7	6
September-88	9/3/1988	9/7/1988	5.4	5	7
August-92	8/11/1992	8/21/1992	0.9	11	8
September-78	9/24/1978	9/30/1978	2.6	7	9
July-72	7/27/1972	8/2/1972	3.3	7	10
September-84	9/15/1984	9/21/1984	2.4	7	11
July-85	7/1/1985	7/5/1985	3.0	5	12
September-83	9/10/1983	9/15/1983	2.2	6	13
August-67	8/29/1967	9/3/1967	1.8	6	14
June-81	6/15/1981	6/19/1981	1.0	5	15
July-80	7/29/1980	8/3/1980	0.3	6	16
August-81	8/26/1981	8/29/1981	0.6	4	17
October-87	10/2/1987	10/6/1987	0.2	5	18
July-90	7/12/1990	7/15/1990	0.2	4	19
June-90	6/26/1990	6/29/1990	0.1	4	20

Duration



Intensity



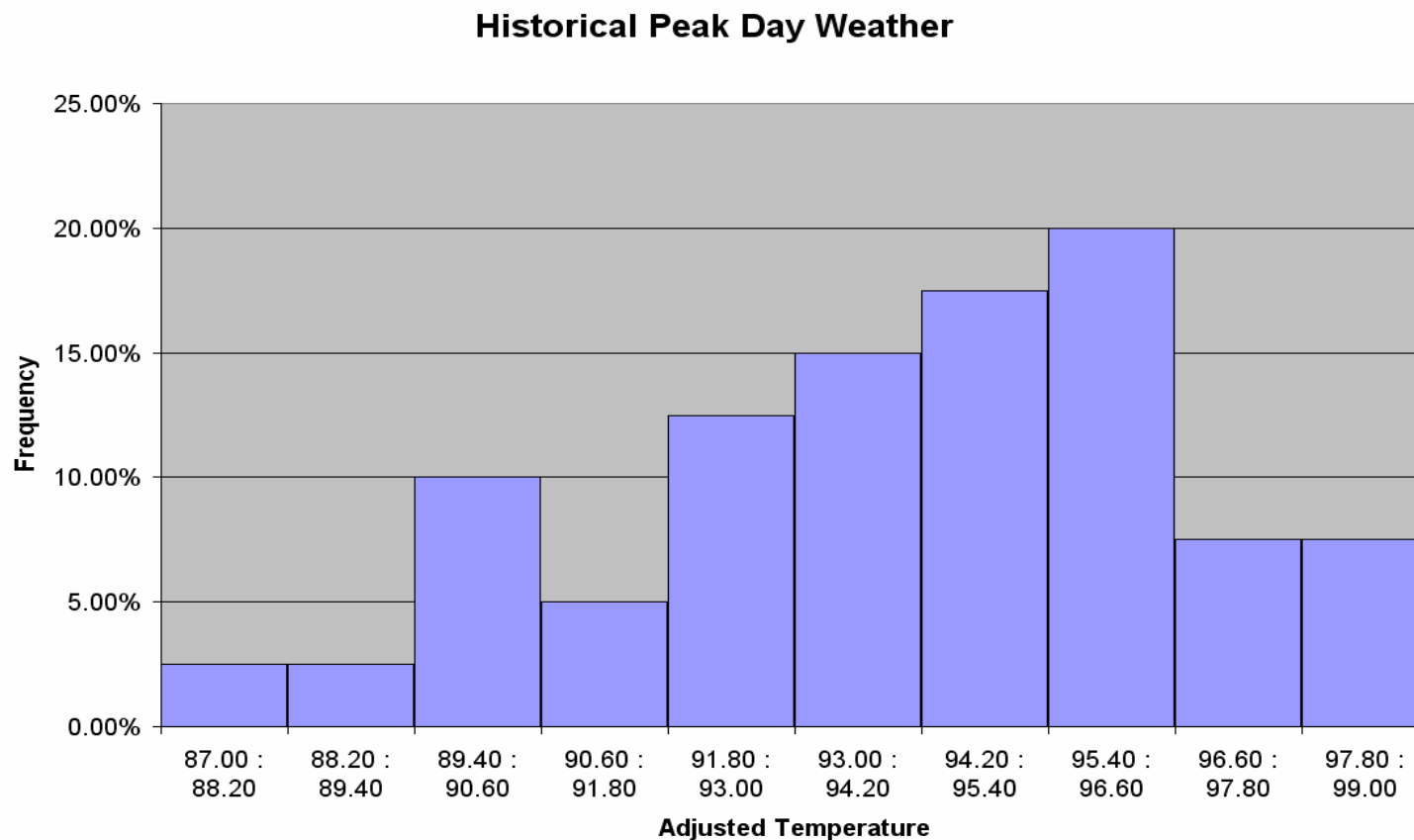
Regional Weather Patterns

- Generally, LADWP's peak is not coincident with CAISO.
- However, both in 1998 and 2006, peaks were coincident.
- Need to study correlation of weather for different ranges of temperature.
- Hypothesis – During extreme weather events, the region loses diversity.

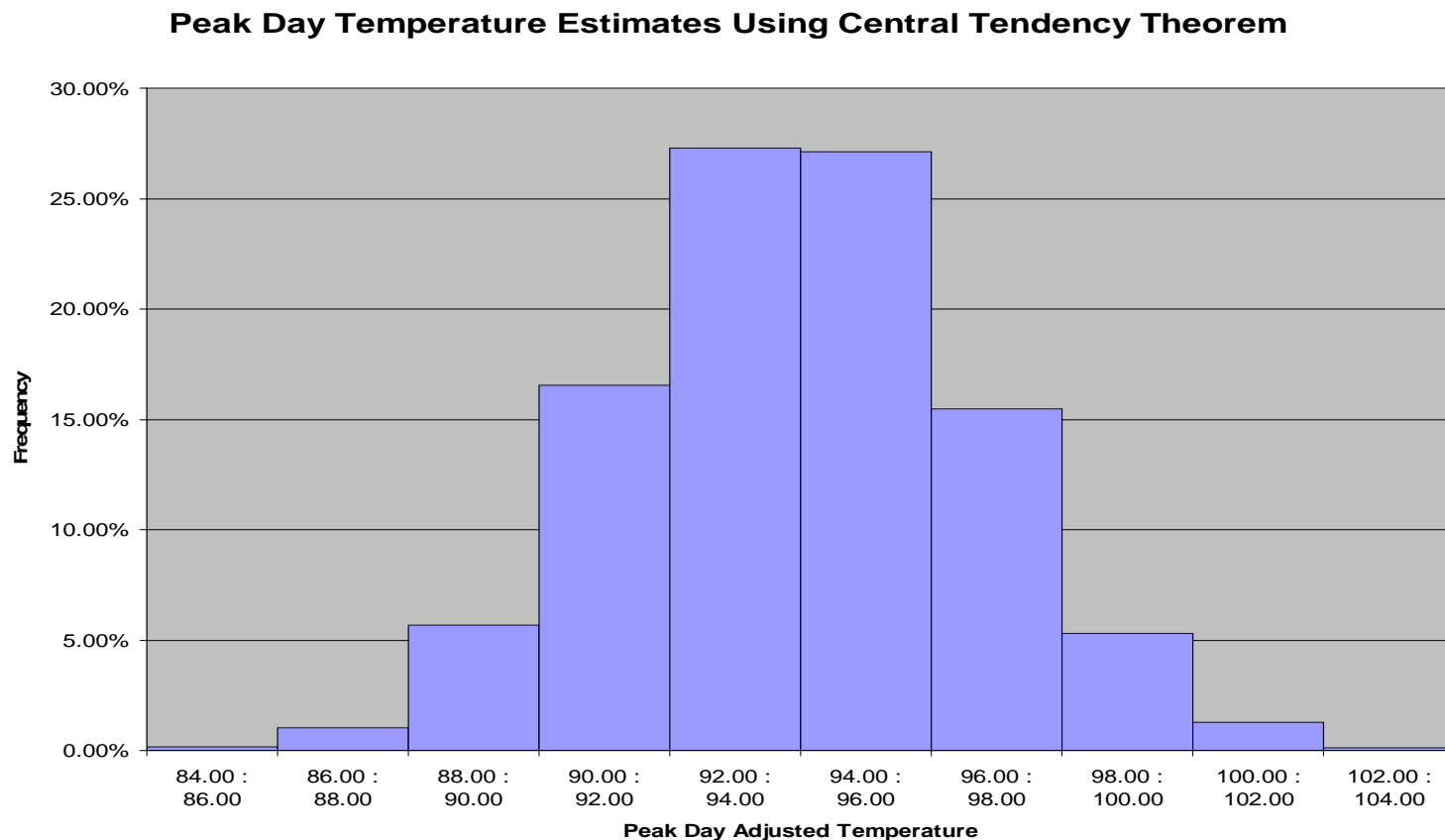
Weather in the Peak Demand Forecast

- Weather is combined into a single variable Including
 - Civic Center, Woodland Hills and LAX weather stations.
 - Dry Bulb temperature
 - Humidity
 - Heat buildup

Weather in the Peak Demand Forecast



Weather in the Peak Demand Forecast



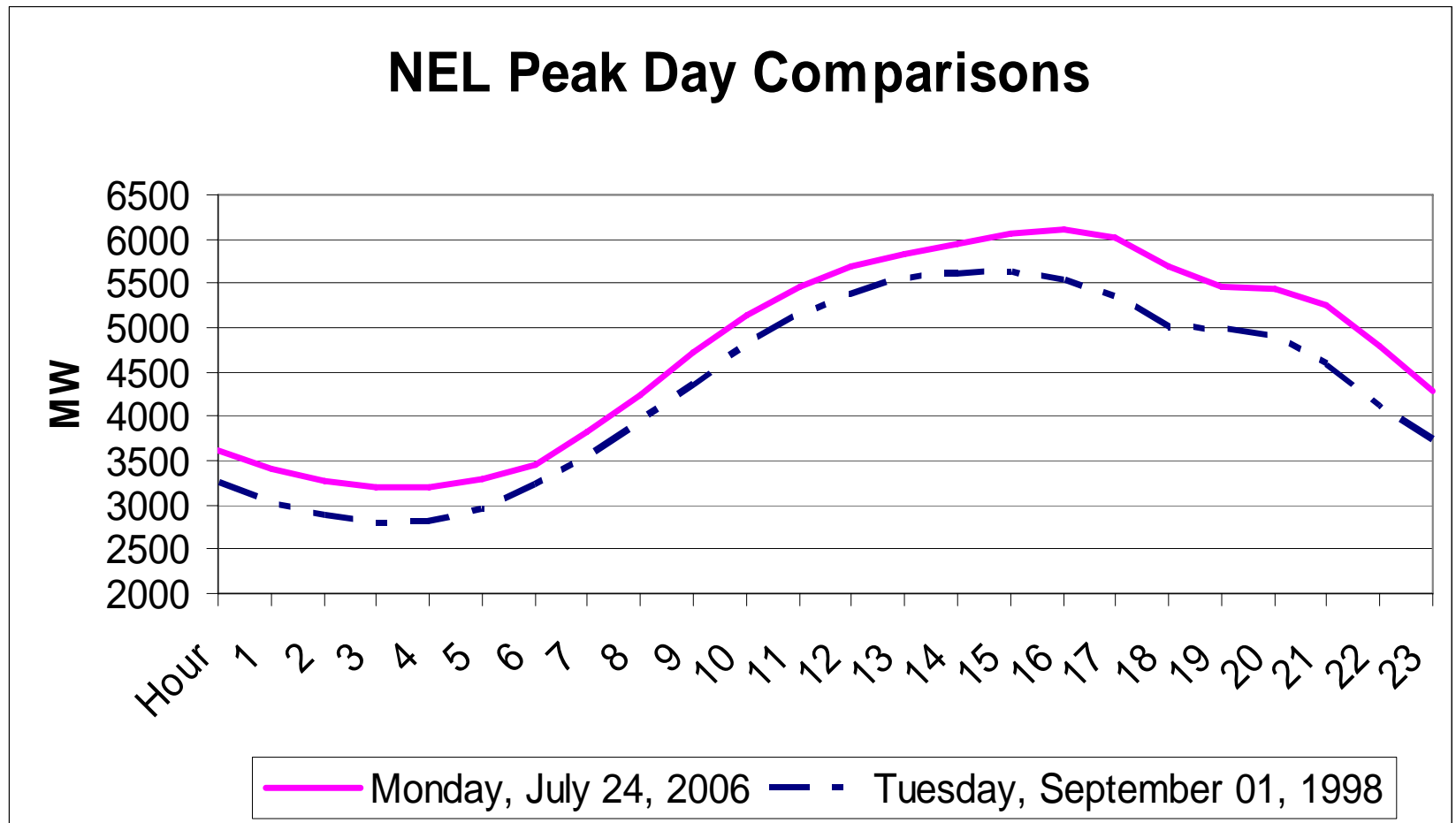
Assumptions to be Challenged

- The peak occurs on a weekday at the end of three-day heat storm.
 - Valley had 36 consecutive days above normal heat
 - Maximum temperature averaged 9 degrees above normal.
- Solution: Increase duration of heat build up effect.

Assumptions to be Challenged

- System reaches saturation at 6000 MW in 2006.
 - Hot case published forecast was 5955 MW.
 - Actual Peak on July 24, 2006 was 6102 MW.
- Solution
 - A model that estimates system saturation.
 - Possibilities include Monte Carlo techniques and/or Extreme Value distributions.
 - View these models as adjuncts to the current megawatt response function using the spline methodology.
- Discovering the System saturation level is a Load Forecaster's Moby Dick.

Assumptions to be Challenged



Assumptions to be Challenged

- In the absence of external factors, demand growth follows load growth.
 - Residential sales growth has been 10% since 1998.
 - Load Research Group measured residential non-coincident demand to have grown by 30%
- National Problem – Platts Electric Utility Week
 - ***ISO New England was "continually underforecasting" demand last year, Giudice observed. That has changed, and in other jurisdictions around the country there is an "awakening" of a new appreciation for the higher peak load curves. "The change in usage is more significant than what the modeling has been able to appreciate," with customer usage outstripping appliance efficiency gains and other demand-dampening factors, Giudice said.***
- Solution – Better integration of Load Research into Load Forecast.

Weather Forecasting?

- Long-run forecasts used for the purposes of financial, generation, transmission and distribution planning should be independent of weather forecasting.
- The methodology of incorporating weather sensitivity cases into the load forecast is sufficient for these purposes.